AMENDMENTS TO THE SPECIFICATION

[0013] In accordance with an important aspect of the invention, the electronic output of the photodetector 36 is electronically heterodyned with a clock signal 40 having a frequency f_2. In particular, the clock signal 40 is mixed with the output of the photodetector 36 by way of a mixer 42. The low frequency product of the mixer 42 is then filtered by a conventional bondpass filter 44 and squared up by way of a ~~comparative~~ comparator 46 and applied to a pulse counter 48.

[0014] The pulse counter 48 is under the control of an electronic reference signal. The electronic reference signal is generated by mixing the clock signal from a clock 27 having a frequency f_1, used to drive the RF driver 28, with the clock signal f_2 from the clock 40. The second clock signal 40 is offset in frequency from the first clock signal 27 by, for example, 100 kHz to 1 MHz. The output of the low frequency product output of the second mixer 50 (i.e. f_1-f_2) is then filtered by a conventional ~~band-pass~~ bandpass filter 52 and squared up by comparator 54 to form a reference signal that is applied to the pulse counter 48. The first clock signal 27 is squared up by way of a comparator 56 and used as the clock signal for the pulse counter 48.

[0016] The sensor output signal may be converted to analog form by way of a digital-to-analog converter 58 and used to drive an optical phase modulator 60. Such optical phase modulators are known in the art. A suitable optical phase modulator is an electro-optic device, such as a lithium niobate waveguide. With such a device, a voltage applied to the top of the waveguide causes a refractive index change of the medium within the waveguide. The optical path of the emitted wave is changed by the waveguide length times the change in the refractive index. The phase change is the path change divided by the wavelength. Such devices are available at Eospace Inc. (www.eospace.com/phase-modulator.htm).